

TRANSMITTAL LETTER TO THE UNITED STATES  
DESIGNATED/ELECTED OFFICE (DO/EO/US)  
CONCERNING A FILING UNDER 35 U.S.C. 371

2964-102P

U.S. APPLICATION NO. (If known, see 37 CFR 1.5)

09/381828

INTERNATIONAL APPLICATION NO.

PCT/SE98/00500

INTERNATIONAL FILING DATE

March 20, 1998

PRIORITY DATE CLAIMED

March 24, 1997

## TITLE OF INVENTION

THE CHARACTERISATION OF PHYSICAL AND CHEMICAL PROPERTIES OF A LIQUID AND A DEVICE THEREFOR

APPLICANT(S) FOR DO/EO/US

SKOLD, Rolf

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39.
4. ☒ A proper Demand for International Preliminary Examination was made by the 19<sup>th</sup> month from the earliest claimed priority date.
5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2)).
- a. ☒ is transmitted herewith (required only if not transmitted by the International Bureau). WO 98/43049
- b. ☒ has been transmitted by the International Bureau.
- c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☐ A translation of the International Application into English (35 U.S.C. 371(c)(3)).
7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(2)).
- a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
- b. ☐ have been transmitted by the International Bureau.
- c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
- d. ☒ have not been made and will not be made.
8. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☐ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11. to 16. below concern document(s) or information included:

11. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98,/-1449 and International Search Report with cited references (PCT/ISA/210)
12. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☒ A FIRST preliminary amendment.
- ☐ A SECOND or SUBSEQUENT preliminary amendment.
14. ☐ A substitute specification.
15. ☐ A change of power of attorney and/or address letter.
16. ☒ Other items or information:
- 1.) International Preliminary Examination Report (PCT/IPEA/409)
- 2.) Two (2) sheets of Formal Drawings

U.S. APPLICATION NO (if known, see 37 CFR 1.5) <div style="font-size: 24pt; font-weight: bold; text-align: center;">09/381828</div>		INTERNATIONAL APPLICATION NO PCT/SE98/00500		ATTORNEY'S DOCKET NUMBER 2964-102P																																																			
17. <input checked="" type="checkbox"/> The following fees are submitted: <b>BASIC NATIONAL FEE (37 CFR 1.492(a)(1)-(5):</b> Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO. .... <b>\$970.00</b>  International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO ..... <b>\$840.00</b>  International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO. .... <b>\$760.00</b>  International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4) ..... <b>\$670.00</b>  International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4). .... <b>\$96.00</b> <b>ENTER APPROPRIATE BASIC FEE AMOUNT =</b>				<b>CALCULATIONS      PTO USE ONLY</b>																																																			
Surcharge of <b>\$130.00</b> for furnishing the oath or declaration later than <input type="checkbox"/> 20 <input checked="" type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(e)).				\$ <b>970.00</b>																																																			
<table border="1" style="width:100%; border-collapse: collapse;"><thead><tr><th style="width:20%;">CLAIMS</th><th style="width:20%;">NUMBER FILED</th><th style="width:20%;">NUMBER EXTRA</th><th style="width:20%;">RATE</th></tr></thead><tbody><tr><td>Total Claims</td><td>10 - 20 =</td><td>0</td><td>X <b>\$18.00</b></td></tr><tr><td>Independent Claims</td><td>2 - 3 =</td><td>0</td><td>X <b>\$78.00</b></td></tr><tr><td colspan="3">MULTIPLE DEPENDENT CLAIM(S) (if applicable)      No</td><td>+ <b>\$260.00</b></td></tr><tr><td colspan="3" style="text-align: right;"><b>TOTAL OF ABOVE CALCULATIONS =</b></td><td><b>\$      1100.00</b></td></tr><tr><td colspan="4">Reduction of 1/2 for filing by small entity, if applicable. Verified Small Entity statement must also be filed (Note 37 CFR 1.9, 1.27, 1.28).</td></tr><tr><td colspan="3" style="text-align: right;"><b>SUBTOTAL =</b></td><td><b>\$      1100.00</b></td></tr><tr><td colspan="4">Processing fee of <b>\$130.00</b> for furnishing the English translation later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(f)).</td></tr><tr><td colspan="3" style="text-align: right;"><b>TOTAL NATIONAL FEE =</b></td><td><b>\$      1100.00</b></td></tr><tr><td colspan="4">Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). <b>\$40.00</b> per property +</td></tr><tr><td colspan="3" style="text-align: right;"><b>TOTAL FEES ENCLOSED =</b></td><td><b>\$      1100.00</b></td></tr><tr><td colspan="4" rowspan="2"></td><td style="text-align: center;">Amount to be: refunded      \$</td></tr><tr><td style="text-align: center;">charged      \$</td></tr></tbody></table>				CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE	Total Claims	10 - 20 =	0	X <b>\$18.00</b>	Independent Claims	2 - 3 =	0	X <b>\$78.00</b>	MULTIPLE DEPENDENT CLAIM(S) (if applicable)      No			+ <b>\$260.00</b>	<b>TOTAL OF ABOVE CALCULATIONS =</b>			<b>\$      1100.00</b>	Reduction of 1/2 for filing by small entity, if applicable. Verified Small Entity statement must also be filed (Note 37 CFR 1.9, 1.27, 1.28).				<b>SUBTOTAL =</b>			<b>\$      1100.00</b>	Processing fee of <b>\$130.00</b> for furnishing the English translation later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(f)).				<b>TOTAL NATIONAL FEE =</b>			<b>\$      1100.00</b>	Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). <b>\$40.00</b> per property +				<b>TOTAL FEES ENCLOSED =</b>			<b>\$      1100.00</b>					Amount to be: refunded      \$	charged      \$		
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a. <input checked="" type="checkbox"/> A check in the amount of \$ <b>1100.00</b> to cover the above fees is enclosed.  b. <input type="checkbox"/> Please charge my Deposit Account. No. _____ in the amount of \$ _____ to cover the above fees. A duplicate copy of this sheet is enclosed.  c. <input checked="" type="checkbox"/> The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. <u>02-2448</u> .  <b>NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.</b>  Send all correspondence to: <b>Birch, Stewart, Kolasch &amp; Birch, LLP</b> <b>P.O. Box 747</b> <b>Falls Church, VA 22040-0747</b> <b>(703)205-8000</b>  <div style="text-align: right;"> SIGNATURE      <b>32,6846</b> <b>KOLASCH, JOSEPH A.</b> NAME  <b>22,463</b> REGISTRATION NUMBER</div>																																																							
/dl September 24, 1999																																																							

420 Rec'd PCT/PTO 24 SEP 1999

## IN THE U.S. PATENT AND TRADEMARK OFFICE

APPLICANTS: SKOLD, Rolf

INT'L. APPLN. NO.: PCT/SE98/00500

SERIAL NO.: NEW

GROUP:

FILED: September 24, 1999

EXAMINER:

FOR: THE CHARACTERISATION OF PHYSICAL AND CHEMICAL  
PROPERTIES OF A LIQUID AND A DEVICE THEREFOR

## PRELIMINARY AMENDMENT

## BOX PATENT APPLICATION

Assistant Commissioner of Patents  
and Trademarks  
Washington, D.C. 20231

September 24, 1999

Sir:

The following Preliminary Amendments and Remarks are respectfully submitted  
in connection with the above-identified application.

## IN THE SPECIFICATION:

Before line 1, insert --This application is the national phase under 35 U.S.C. §371  
of PCT International Application No. PCT/SE98/00500 which has an International filing  
date of March 20, 1998 which designated the United States of America.--

**IN THE CLAIMS:****CLAIM 3:** Line 1, change "Claims 1 or 2" to --Claim 1--**CLAIM 4:** Line 1, change "any of Claims 1-3" to --Claim 1--

**CLAIM 5:** Line 1, change "any of Claims 1-4" to --Claim 1--

**CLAIM 6:** Line 1, change "any one of Claims 1-5" to --Claim 1--

**CLAIM 9:** Line 1, change "any of Claims 8 or 9" to --Claim 8--

**CLAIM 10:** Line 1, change "Claims 7, 8 or 9" to --Claim 7--

### **REMARKS**


The specification has been amended to provide a cross-reference to the previously filed International Application.

The above amendment to the claims is merely to delete undesired multiple dependencies and places the application into better form prior to examination.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §1.16 or under 37 C.F.R. §1.17; particularly, extension of time fees.

Respectfully submitted,

BIRCH, STEWART, KOLASCH & BIRCH, LLP

By  32,644  
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(703) 205-8000

JAK/dll

09/381828

Docket Number: 2964-102P

**STATEMENT CLAIMING SMALL ENTITY STATUS**  
**(37 CFR 1.9(f) & 1.27(b)) - INDEPENDENT INVENTOR**

Applicant, Patentee, or Identifier: Rolf SKOLDApplication or Patent No.: New

Filed or Issued: \_\_\_\_\_

Title: THE CHARACTERISATION OF PHYSICAL AND CHEMICAL PROPERTIES OF A LIQUID  
AND A DEVICE THEREFOR

As a below named inventor, I hereby state that I qualify as an independent inventor as defined in 37 CFR 1.9(c) for purposes of paying reduced fees to the Patent and Trademark Office described in:

- ☐ the specification filed herewith with title as listed above.  
☐ the application identified above.  
☐ the patent identified above.

I have not assigned, granted, conveyed, or licensed, and am under no obligation under contract or law to assign, grant, convey, or license, any rights in the invention to any person who would not qualify as an independent inventor under 37 CFR 1.9(c) if that person had made the invention, or to any concern which would not qualify as a small business concern under 37 CFR 1.9(d) or a nonprofit organization under 37 CFR 1.9(e).

Each person, concern, or organization to which I have assigned, granted, conveyed, or licensed or am under an obligation under contract or law to assign, grant, convey, or license any rights in the inventions is listed below:

- ☐ No such person, concern, or organization exists.  
☐ Each such person, concern, or organization is listed below.

Separate statements are required from each named person, concern, or organization having rights to the invention stating their status as small entities. (37 CFR 1.27)

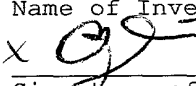
I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is not longer appropriate.  
 (37 CFR 1.28(b))

Rolf SKOLD

Name of Inventor

Name of Inventor

Name of Inventor


 Signature of Inventor

Signature of Inventor

Signature of Inventor

400 Rec'd PCT/PTO 24 SEP 1999

THE CHARACTERISATION OF PHYSICAL AND CHEMICAL PROPERTIES OF A  
LIQUID AND A DEVICE THEREFOR

The present invention relates to a method and a device enabling the access of a large number of measuring points of physical or chemical properties of a liquid as a function of temperature and concentration of a component. The method is well suited for the production of three-dimensional diagrams; e.g. phase diagrams, by the application of computer technology.

The creation of phase diagrams is usually done by storing a large number of liquid chemical mixtures having varying compositions or total concentrations, at different temperatures until phase equilibria have been established, i.e. long enough to allow e.g. phase separations, the formation of solutions or phase transitions, like melting or crystallinity changes, to occur. This involves the expenditure of a substantial work effort and time, not least in view of the fact that the procedure may have to be repeated several times in order to obtain complementary information and each round of tests may take weeks or months. There is hence a great need to simplify the procedure and to shorten the time needed to produce a phase diagram for the description of physical and chemical properties of a liquid.

In the patent literature, WO 92/02 824 describes a method of generating a phase diagram for the conversion of reactor feed in a fluidised bed reactor by measuring concentration of at least two gases in the reaction gas in a region, measuring pressure and temperature in the region, determining concentration of selected remaining gases in said reaction gas and generating a phase diagram indicative whether the reaction gas is suitable for the conversion. US patent 4 810 286 discloses a method to reduce dissolved oxygen and carbon in molten steel by following an idealised trajectory defined by an upper and lower boundary defined by the carbon/oxygen equilibrium curves at atmospheric pressure and at sub-atmospheric pressure, respectively. US patent 4 122 343 relates to a method of generating correlating data from various products of thermal degradation of biological specimens. However, none of these publications discloses any simple and time reducing method of producing a three-dimensional phase diagram with a physical or chemical property as a function of temperature and component concentration.

It has now been found that a considerable saving in time and work can be accomplished by performing measurements in a measuring cell whereby temperature and component con-

centration are used as the two independent variables. According to the method, several dependent physical and/or chemical properties can be measured simultaneously in the same cell at the same temperature and composition. The independent variables are varied in a predetermined fashion and at all desired measuring points one or several dependent variables are measured.

More specifically, the present invention relates to a method and a device therefore which enables the ready characterisation of the physical and/or chemical properties of a liquid, e.g. in form of a three-dimensional phase diagram. The method is characterised in that

- 1) at least one dependent physical and/or chemical property of a liquid is measured as a function of temperature and a component concentration as independent variables,
- 2) the values for the component concentration are determined by calculation, based on data from control programs for the change of component concentration in a computer and the temperatures are determined by calculation from the temperature control programs or by measurements;
- 3) the value of the component concentration is changed by adding in one step or gradually a predetermined amount of another liquid containing a different component concentration, and a representative number of measurements of the dependent physical or chemical property are performed within the whole selected temperature range within the predetermined change of the component concentration,
- 4) the procedures above are repeated at desired component concentrations and temperatures in order to obtain a wanted number of values;
- 5) the values obtained for the dependent properties are combined with the values for the independent properties to measuring points; and
- 6) the measuring points electronically stored in the computer are co-ordinated and visualised in a three-dimensional diagram

The measurements are suitably performed in one measuring cell, which is combined with two sets of control equipment, which comprise or are attached to the control programs for the change of temperature and component concentration, and measuring organs for the determination of at least one physical and/or chemical property and optionally at least one measuring organ for the determination of temperature. The visualisation of data can be done e.g. by presenting the measuring points in a three-dimensional diagram or in a hologram.

The component concentration or concentrations, which constitute one of the independent parameters, are determined by computation from data of component addition. Concentrations may e.g. be varied by the addition of a solvent, such as water, whereby a successive dilution is obtained or by the addition of a concentrate of the dissolved or dispersed component for a successive increase of the component concentration. One preferred method, particularly at low concentrations of components, is to take away a certain volume and thereafter add approximately the same volume of the liquid with a different concentration of the components. The advantage of this method of concentration control is that the total volume of liquid can be kept essentially constant. The concentration of components may be changed gradually or in a discrete steps. In the case that the component concentration is changed in discrete steps, measurements of physical and/or chemical properties are performed over the entire desired temperature interval at each component concentration. In the case that components concentration is changed gradually a large number of measurements of the physical and/or chemical properties are performed within a short period of time, in order to obtain a representative number of measurements in the entire desired temperature range and within the predetermined range of the component concentration. The predetermined amount added in one step or gradually may vary within wide limits but normally amounts to 0.01-5 % by weight of the liquid.

During measurements of the physical and/or chemical properties it is preferred to measure the temperature, even if this could be determined from control data. The procedure described above is repeated at such a number of component concentrations and temperatures that an adequate number of measuring points is obtained for the creation of a three-dimensional diagram. The temperature may also be changed either continuously or in a stepwise manner. In order to reduce the number of changes of temperature needed, measurements may be performed both while increasing the temperature and while decreasing the temperature.

Measured and calculated values are stored and compiled into a diagram with three or more variables. This is suitably done in a computer with an I/O interface device for the control of the independent variables, as well as for data collection. A computer is also used for the presentation of data. For a graphical presentation of data, the computer may be connected to a video screen and/or a printer.



The present invention also comprises a device for performing the method. The device is characterised in that it comprises

- a) at least one measuring cell provided with
  - i) an equipment for the homogenisation of a liquid,
  - ii) at least two control equipment, which comprise or are attached to control programs for changing the two independent variables, component concentration and temperature, in a predetermined manner, the control equipment of the component concentration comprising a dosage organ for the addition of another liquid containing a different component concentration,
  - iii) at least one measuring organ for the determination of at least one dependent physical and/or chemical property of the liquid, and
  - iv) optionally a measuring organ for the determination of the temperature,
- b) at least one computer for
  - i) the reception and storage of data relating to the dependent and independent variables via at least one electronic circuit and the calculation of at least the component concentration from data obtained from the control program and
  - ii) compilation of the received and calculated values into three-dimensional measuring points and
- c) equipment for visualisation of the measuring points stored in the computer in a three-dimensional diagram.

The equipment for the control of the temperature of the liquid may comprise a jacket or a tube coil for the heating and/or cooling with a heat transfer medium such as water, polyethylene glycol or silicon oil. Alternatively, heating may be done by an electric heating element. Cooling and heating may be controlled via a computer program or by a constant supply of the heat transfer medium. The equipment for the control of component concentration comprises one or several dosage organs for the withdrawal of the liquid and the injection of another liquid with a different component concentration. Exchanged liquid amounts are controlled by a program in the computer. Dosage data are used to calculate the corresponding component concentration or concentrations for the measuring points.

A device for the performance of the method according to the invention is shown schematically in Figure 1. Figure 2 shows a three-dimensional diagram, in which the turbidity

(NTU) of an alkyl polyethylene glycol compound in water is visualised as a function of temperature ( $^{\circ}\text{C}$ ) and concentration ( $\%(\text{w/w})$ ) of the alkyl polyethylene glycol compound.

In Figure 1 is shown a measuring cell 1, which is equipped with a stirrer 2, a motor driven burette 3, which in a predetermined manner controls component concentration in a liquid 4. From a computer 5 with an I/O interface equipment, control signals are sent to the burette 3 via an electronic circuit 6. In addition, control signals for heating and cooling are being sent via circuits 7 and 8. A heat transfer jacket 17 surrounding the measuring cell serves to transfer temperature changes to the liquid. A combined turbidimeter and polarimeter 9 with a common light source 10 measures turbidity and optical activity, respectively. Measured values are transmitted via circuits 11' and 12' to the computer 5 for storage. A conductivity meter 13, a pH meter 14 and a temperature meter 15 measure specific conductivity, pH and temperature, respectively. Measured values are transmitted for storage to the computer 5 via circuits 13', 14' and 15', respectively, while the viscosity of the medium may be measured from the needed electric effect input to keep stirring at a constant speed. The measured value for stirrer effect demand is transmitted to the computer 5 via circuit 2'. Measured and computed values are compiled in the computer 5 to e.g. tables or at least three-dimensional diagrams which are displayed 16 on a video screen or on paper via a printer.

In the three-dimensional diagram in Figure 2 is shown that the turbidity of the present alkyl polyethylene glycol is low at temperatures from ca.  $20^{\circ}\text{C}$  to about  $30^{\circ}\text{C}$  at a concentration of 0.2 – 1.6 percent by weight of the alkyl polyethylene glycol. A substantial cloudiness is appearing in the temperature range between ca.  $32 - 40^{\circ}\text{C}$  and persists up to  $80^{\circ}\text{C}$ , which is the end of the present temperature range, with the exception of a local partial clearing in the temperature range from ca.  $54^{\circ}\text{C}$  to ca  $60^{\circ}\text{C}$ .

By using the method and the device according to the present invention it is possible to measure simultaneously a large number of different physical and/or chemical variables, such as the pH, conductivity and turbidity of fluids as functions of the temperature and the concentration of one component, which may consist of one or several substances. By combining several measuring organs in the measuring cell, it is possible with a minimum expenditure of time and labour to obtain data in a form that allows an overview of the dependent variables over a wide range of temperatures and concentrations. The method and the device are

useful e.g. for the rapid investigation of phase equilibria. Thus turbidity offers a good picture of where in the three-dimensional diagram two or more phases coexist in a mixture. When an isotropic solution, e.g. surfactants in water, exists or when a large volume of a phase, e.g. a micellar solution, is in equilibrium with a small volume of a different phase, e.g. a surfactant rich phase, low turbidities are measured. When the volume of the smaller phase increases, e.g. by the addition of a surfactant with a limited solubility in water, an increase in the turbidity will occur and vice versa. Different combinations of data from e.g. turbidity, pH, conductivity, viscosity as well as optical and spectrophotometrical data can offer essential information about changes in the state of aggregation of dissolved species, such as the appearance or disappearance of viscous phases, such as hexagonal liquid crystalline phases or other optically active liquid crystalline phases as a result of changes in the concentration of one or more components in the mixture or a temperature change.

Viscosity can be calculated from measured data of power needed or rotational speed of the electrical motor which may be used to drive the stirring device. Thus, a higher power demand at a constant rate of rotation or a slower rotational speed at a constant power input indicate a higher viscosity as a result of a change in temperature or composition. The appearance or disappearance of optically active phases as a result of a change in temperature or composition can be indicated by measured changes in the amount of light passing through two crossed polarisers positioned on each side of the chemical mixture in a transparent measuring vessel with a light source before the first polariser and a light sensitive detector after the other polariser. A suitable dependent variable that indicates solubility, e.g. light scattering or turbidity, can be used for a simple indication of the presence of dispersed matter

The method and the device may in principle be used for all types of liquids, such as solutions, semisolid solutions and dispersions, to an extent that depends on which dependent variables are suitable to measure under the prevailing conditions of the liquid.

## CLAIMS

1. A method for the characterisation of physical and/or chemical properties of a liquid, characterised in that,
  - 1) at least one dependent physical and/or chemical property of a liquid is measured as a function of temperature and a component concentration as independent variables,
  - 2) the values for the component concentration are determined by calculation, based on data from control programs for the change of component concentration in a computer and the temperatures are determined by calculation from the temperature control programs or by measurements;
  - 3) the value of the component concentration is changed by adding in one step or gradually a predetermined amount of another liquid containing a different component concentration, and a representative number of measurements of the dependent physical or chemical property are performed within the whole selected temperature range within the predetermined change of the component concentration,
  - 4) the procedures above are repeated at desired component concentrations and temperatures in order to obtain a wanted number of values;
  - 5) the values obtained for the dependent properties are combined with the values for the independent properties to measuring points; and
  - 6) the measuring points electronically stored in the computer are co-ordinated and visualised in a three-dimensional diagram.
2. A method according to Claim 1, characterised in that, a series of measurements are done under rising temperature, and following series of measurements are done under decreasing temperatures and vice versa.
3. A method according to Claims 1 or 2, characterised in that, one portion of the liquid is removed and the same volume of the another liquid containing a different concentration of the component is thereafter added.
4. A method according to any of Claims 1-3, characterised in that, the changes in concentration and/or the temperature are controlled by a program in the computer.
5. A method according to any of Claims 1-4, characterised in that, the temperature of each measuring point is measured simultaneously with the physical and/or chemical property.

6. A method according to any one of Claims 1-5, characterised in that, the predetermined amount of the another liquid added to the liquid amends the concentration of the component in the liquid with 0.01-5 % by weight.

7. A device for the characterisation of the physical and/or chemical properties of a liquid, characterised in that, it comprises

a) at least one measuring cell (1) provided with

i) an equipment (2) for the homogenisation of a liquid,

ii) at least two control equipment (3, 17), which comprise or are attached to control programs for changing of the two independent variables, component concentration and temperature, in a predetermined manner, the control equipment (3) of the component concentration comprising a dosage organ for the addition of another liquid containing a different component concentration,

iii) at least one measuring organ (9, 13, 14) for the determination of at least one dependent physical and/or chemical property of the liquid, and

iv) optionally a measuring organ (15) for the determination of the temperature,

b) at least one computer (5) for

i) the reception and storage of data relating to the dependent and independent variables via at least one electronic circuit (11', 12', 13', 14', 15') and the calculation of at least the component concentration from data obtained from the control program and

ii) compilation of the received and calculated values into three-dimensional measuring points and

c) equipment (16) for visualisation of the measuring points stored in the computer in a three-dimensional diagram.

8. A device according to Claim 7, characterised in that, the equipment for the control of the temperature of the fluid comprises a jacket (17) or a heating coil for the cooling and/or heating by means of a heat transfer medium, whereby cooling and heating is controlled by a program in the computer (5).

9. A device according to any of Claims 8 or 9, characterised in that the equipment (3) for the control of component concentration by means of one or several dosing organs for the withdrawal and injection of the same amount of the fluid but with a different concentration, whereby amounts are controlled by a program in the computer (5).

10. A device according to Claims 7, 8 or 9, distinguished by the fact that control programs are included in the computer (5).

Fig. 1

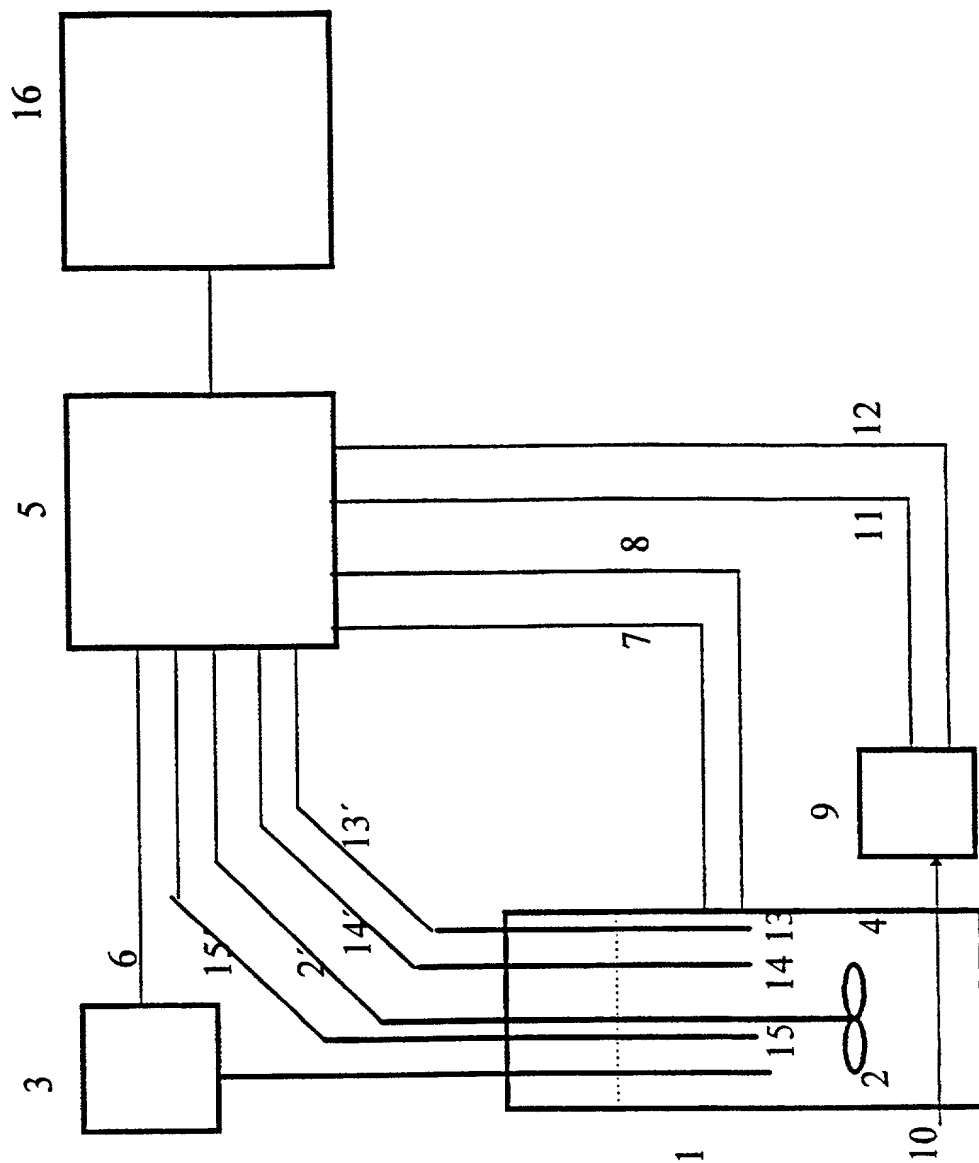
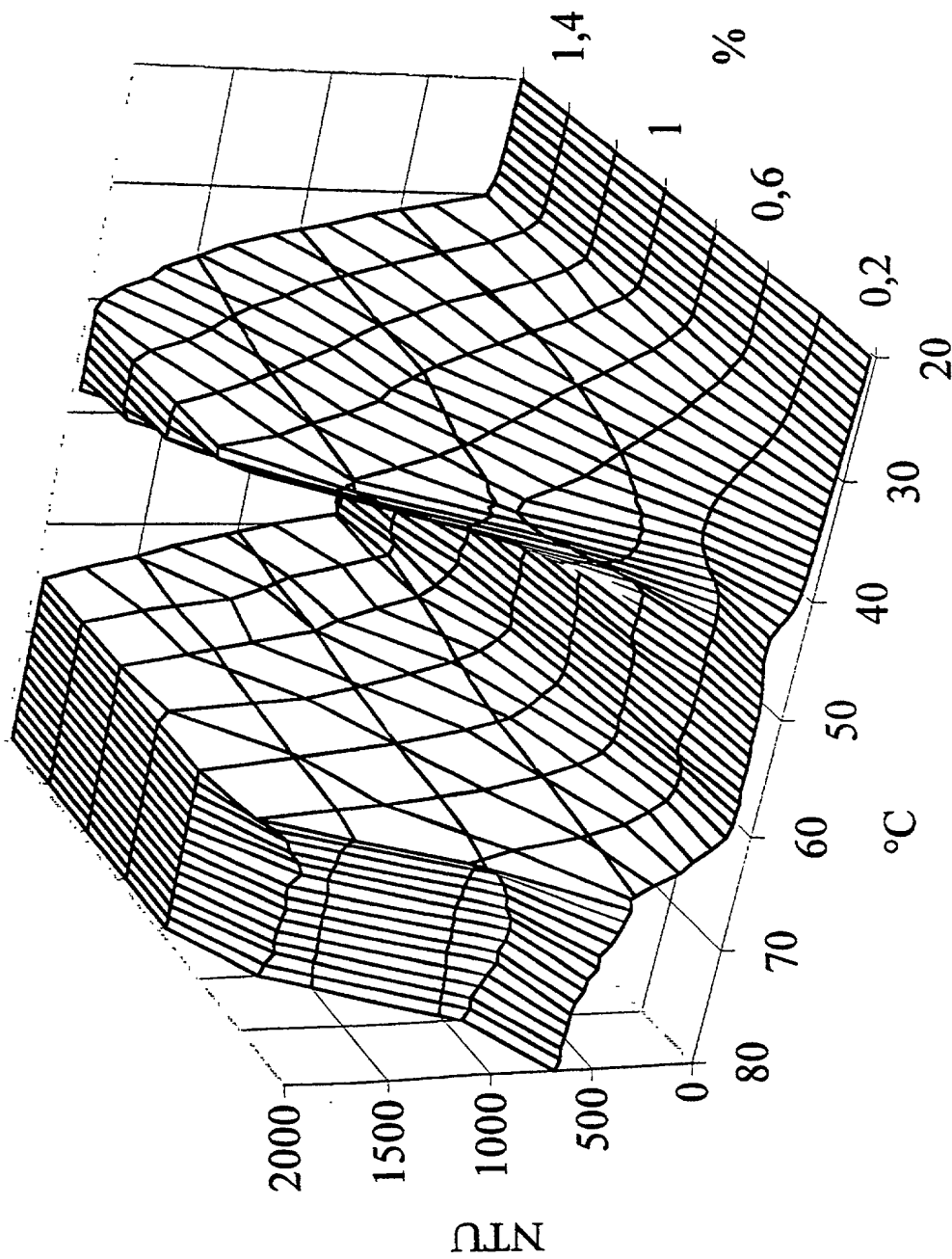


Fig. 2





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# COMBINED DECLARATION AND POWER OF ATTORNEY FOR PATENT AND DESIGN APPLICATIONS

As a below named inventor, I hereby declare that: my residence, post office address and citizenship are as stated next to my name; that I verily believe that I am the original, first and sole inventor (if only one inventor is named below) or an original, first and joint inventor (if plural inventors are named below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

Insert Title:

THE CHARACTERISATION OF PHYSICAL AND CHEMICAL PROPERTIES OF A LIQUID AND A DEVICE THEREFOR

Fill in Appropriate  
 Information -  
 For Use Without  
 Specification  
 Attached:

the specification of which is attached hereto. If not attached hereto,

the specification was filed on \_\_\_\_\_ as  
 United States Application Number \_\_\_\_\_;  
 and amended on \_\_\_\_\_ (if applicable) and/or  
 the specification was filed on March 20, 1998 as PCT  
 International Application Number PCT/SE98/00500; and was  
 amended under PCT Article 19 on \_\_\_\_\_ (if applicable)

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, §1.56. I do not know and do not believe the same was ever known or used in the United States of America before my or our invention thereof, or patented or described in any printed publication in any country before my or our invention thereof or more than one year prior to this application, that the same was not in public use or on sale in the United States of America more than one year prior to this application, that the invention has not been patented or made the subject of an inventor's certificate issued before the date of this application in any country foreign to the United States of America on an application filed by me or my legal representative or assigns more than twelve months (six months for designs) prior to this application, and that no application for patent or inventor's certificate on this invention has been filed in any country foreign to the United States of America prior to this application by me or my legal representatives or assigns, except as follows.

I hereby claim foreign priority benefits under Title 35, United States Code, §119(a)-(d) of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

## Prior Foreign Application(s)

## Priority Claimed

<u>9701092-0</u> (Number)	<u>Sweden</u> (Country)	<u>March 24, 1997</u> (Month/Day/Year Filed)	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
_____ (Number)	_____ (Country)	_____ (Month/Day/Year Filed)	<input type="checkbox"/> Yes	<input type="checkbox"/> No
_____ (Number)	_____ (Country)	_____ (Month/Day/Year Filed)	<input type="checkbox"/> Yes	<input type="checkbox"/> No
_____ (Number)	_____ (Country)	_____ (Month/Day/Year Filed)	<input type="checkbox"/> Yes	<input type="checkbox"/> No

I hereby claim the benefit under Title 35, United States Code, §119(e) of any United States provisional applications(s) listed below.

_____ (Application Number)	_____ (Filing Date)
_____ (Application Number)	_____ (Filing Date)

All Foreign Applications, if any, for any Patent or Inventor's Certificate Filed More than 12 Months (6 Months for Designs) Prior to the Filing Date of This Application:

Country	Application Number	Date of Filing (Month/Day/Year)
_____	_____	_____
_____	_____	_____

Insert Requested  
 Information:  
 (if appropriate)

I hereby claim the benefit under Title 35, United States Code, §120 of any United States and/or PCT application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States and/or PCT application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose information which is material to the patentability as defined in Title 37, Code of Federal Regulations, §1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application.

Insert Prior U.S.  
 Application(s):  
 (if any)

_____ (Application Number)	_____ (Filing Date)	_____ (Status - patented, pending, abandoned)
_____ (Application Number)	_____ (Filing Date)	_____ (Status - patented, pending, abandoned)

I hereby appoint the following attorneys to prosecute this application and/or an international application based on this application and to transact all business in the Patent and Trademark Office connected therewith and in connection with the resulting patent based on instructions received from the entity who first sent the application papers to the attorneys identified below, unless the inventor(s) or assignee provides said attorneys with a written notice to the contrary:

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full Name of First  
 or Sole Inventor  
 Insert Name of  
 Inventor  
 Insert Date This  
 Document is Signed

Insert Residence  
 Insert Citizenship

Insert Post Office  
 Address

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 Inventor, if any,  
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Full Name of Third  
 Inventor, if any,  
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\*DATE OF SIGNATURE